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National Eutrophication Survey, Las Vegas, Nev

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NATIONAL EUTROPHICATION SURVEY

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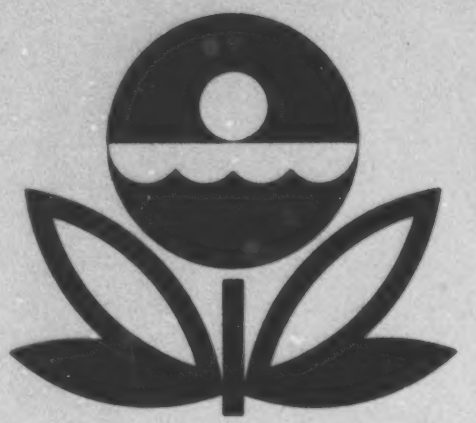

CORVALLIS ENVIRONMENTAL RESEARCH LABORATORY - CORVALLIS, OREGON

and

ENVIRONMENTAL MONITORING & SUPPORT LABORATORY - LAS VEGAS, NEVADA

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REPORT

ON

THEODORE ROOSEVELT LAKE

GILA COUNTY

ARIZONA

EPA REGION IX

WORKING PAPER No. 735

WITH THE COOPERATION OF THE

ARIZONA STATE DEPARTMENT OF HEALTH

AND THE

ARIZONA NATIONAL GUARD

SEPTEMBER, 1977

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16. ABSTRACT

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

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REPORT ON THEODORE ROOSEVELT LAKE

GILA COUNTY, ARIZONA

EPA REGION IX

by

National Eutrophication Survey

Water and Land Quality Branch
Monitoring Operations Division
Environmental Monitoring & Support Laboratory
Las Vegas, Nevada

and

Special Studies Branch
Corvallis Environmental Research Laboratory
Corvallis, Oregon

Working Paper No. 735

OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY

September 1977

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FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to freshwater lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point source discharge reduction and nonpoint source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's freshwater lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by the U.S. Environmental Protection Agency and to augment plans implementation by the states.

ACKNOWLEDGMENTS

The staff of the National Eutrophication Survey (Office of Research and Development, U.S. Environmental Protection Agency) expresses sincere appreciation to the Arizona State Department of Health for professional involvement, to the Arizona National Guard for conducting the tributary sampling phase of the Survey, and to those Arizona wastewater treatment plant operators who provided effluent samples and flow data.

The staffs of the Bureau of Water Quality Control, Environmental Health Services, Arizona State Department of Health, and the Arizona Game and Fish Department, provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports and provided critiques most useful in the preparation of this Working Paper Series.

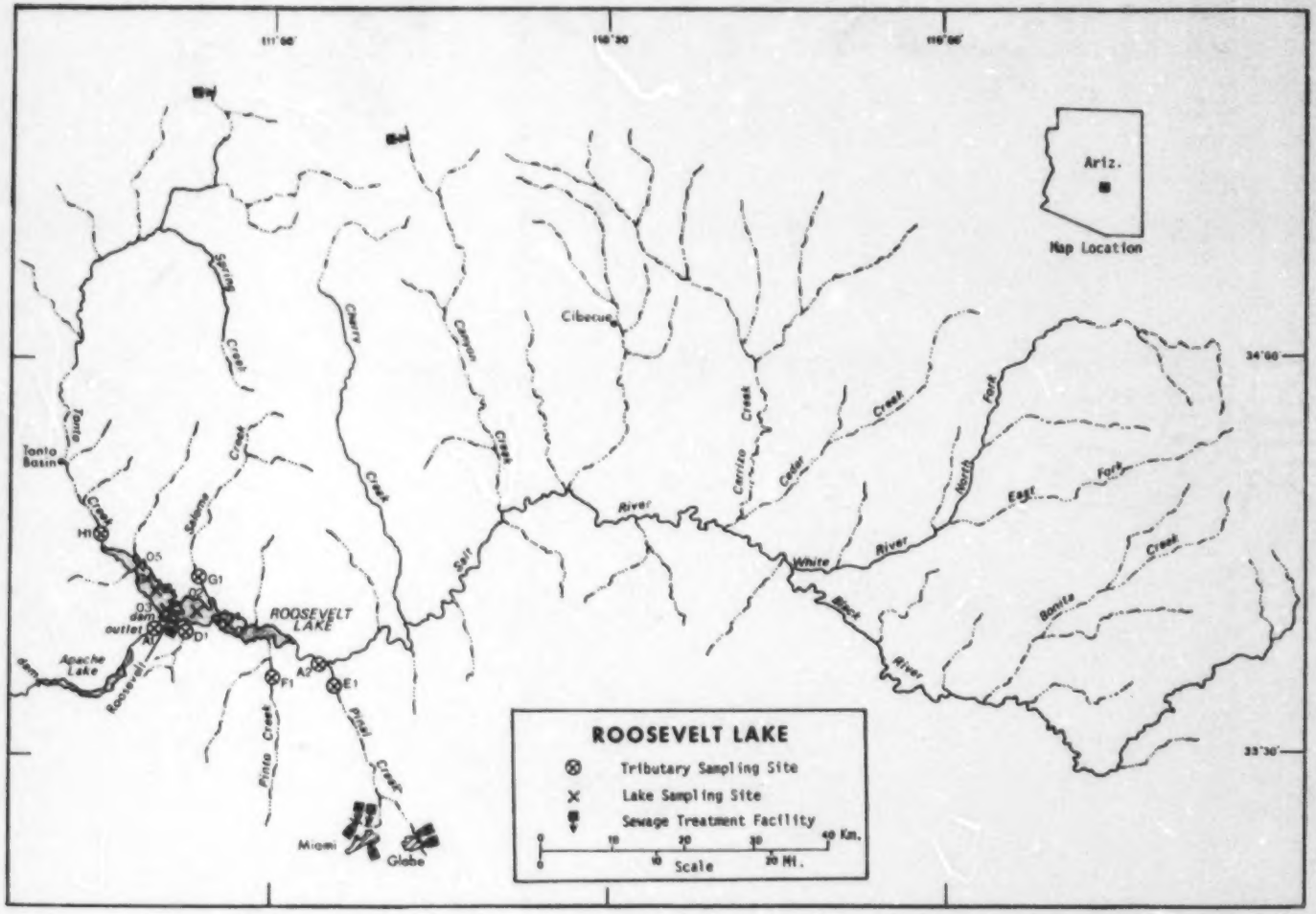
Major General John G. Smith, the Adjutant General of Arizona, and Project Officer Colonel Richard A. Colson, who directed the volunteer efforts of the Arizona National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF ARIZONA

LAKE NAME	COUNTY
Big Lake	Apache
Fools Hollow Lake	Navajo
Lake Havasu	Mohave (San Bernadino in CA)
Luna Lake	Apache
Lyman Lake	Apache
Lake Mohave	Mohave (Clark in NV)
Lake Pleasant	Yavapai, Maricopa
Lake Powell	Coconino (Kane, Garfield, San Juan in UT)
Rainbow Lake	Navajo
Theodore Roosevelt Lake	Gila
San Carlos Reservoir	Graham, Gila, Pinal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Map Location
Cibecue
Tonto Basin
Tonto Creek
Spring Creek
Cherry Creek
Canyon Creek
Salome Creek
Carrizo Creek
Cedar Creek
North Fork
East Fork
White River
Black River
Bonita Creek
Salt River
ROOSEVELT LAKE
Apache Lake
Roosevelt dam
H1
O5
G1
O3 dam outlet
D1
A2
F1
E1
Pinto Creek
Pinal Creek
Miami
Globe
ROOSEVELT LAKE
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Facility
0 10 20 30 40 Km.
0 10 20 Mi.
Scale

REPORT ON THEODORE ROOSEVELT LAKE, ARIZONA

STORET NO. 0410

I. CONCLUSIONS

A. Trophic Condition:*

Survey data indicate that Theodore Roosevelt Lake is mesotrophic. Chlorophyll a values in the lake ranged from 2.3 µg/l to 5.7 µg/l, with a mean of 4.1 µg/l. Potentials for primary production as measured by algal assay control yields were moderately low except at Stations 03-05 in November when the yield was relatively high. Of the 11 Arizona Lakes sampled in 1975, 7 had higher median total phosphorus values, (0.020 mg/l), 9 had higher median inorganic nitrogen levels (0.040 mg/l), and 7 had higher median orthophosphorus levels (0.008 mg/l) than Theodore Roosevelt Lake.

Survey limnologists did not observe any problem algal blooms or macrophyte growths in the lake during the sampling year.

*See Appendix E.

B. Rate-Limiting Nutrient:

The algal assay results indicate that primary production in Theodore Roosevelt Lake was limited by available phosphorus levels. The lake data suggest primary limitation in the lake by nitrogen on all sampling occasions.

C. Nutrient Controllability:

1. Point sources -

During the sampling year, the listed point sources were calculated to have contributed 11.9% of the total phosphorus load to Theodore Roosevelt Lake; 8.8% of the annual total was calculated to be contributed by the city of Globe. However, this loading estimation may be excessively high, since the Arizona Department of Health Services (W.H. Shafer, Personal Communication) indicates much of the effluent from Globe is used for irrigation and thus may not reach the lake in undiminished form. The remaining phosphorus point source load was attributable to six smaller sewage treatment facilities, with the city of Miami and the Miami High School contributing 1.4% each to the total phosphorus contribution.

In addition, there are two fish hatcheries located upstream on Canyon and Tonto Creeks which are known to impact Roosevelt Lake. During the 1975 sampling year, the

operators of these fish hatcheries provided monthly discharge chemistry samples and flow data which reveal that the Canyon Creek Fish Hatchery contributed 1,145 kg P and the Tonto Creek Fish Hatchery contributed 595 kg P/yr to their respective tributary waters. However, both hatcheries are located considerably further away from Roosevelt Lake than 40 stream km (25 miles), and for this reason are not included in the lake nutrient budget on pages 15-16. The Canyon Creek Fish Hatchery contributions are included in the nutrient loadings to the lake from Station A-2, Salt River.

The present phosphorus loading of 2.08 g $P/m^2/yr$ is three times that proposed by Vollenweider (1975) as "eutrophic" for a lake of such volume and retention time. Vollenweider's model, however, is not applicable to a lake with fluctuating volume such as Theodore Roosevelt Lake. Drawdown occurs yearly for downstream irrigation and power purposes (W.H. Shafer, Personal Communication). Additional sampling is needed to better define the nutrient budget of the lake before recommendations on controllability can be proposed.

2. Nonpoint sources -

Nonpoint sources, including precipitation, contributed 88.1% of the total phosphorus input to Theodore Roosevelt

Lake during the sampling year. The Salt River contributed 82.8% and minor tributaries and ungaged drainage areas were estimated to have contributed 4.5% of the total.

The phosphorus export rate of Salt River (9 kg P/km^2/yr) compares favorably with the tributary export rates of nearby San Carlos Reservoir* (8-15 kg P/km^2/yr).

*See Working Paper No. 736.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS

Lake and drainage basin characteristics are itemized below. Lake morphometry data were provided by Ned L. Rathbun, (1974); average surface area and maximum volume at spillway are indicated. Tributary flow data were provided by the Arizona District Office of the U.S. Geological Survey (USGS). Outlet drainage area includes the lake surface area. Mean hydraulic retention time was obtained by dividing the lake volume by mean flow of the outlet. Precipitation values are estimated by methods as outlined in National Eutrophication Survey (NES) Working Paper No. 175. A table of metric/English conversions is included as Appendix A.

A. Lake Morphometry:

1. Surface area: 60.70 km^2.
2. Mean depth: 28.0 meters.
3. Maximum depth: 71.3 meters.
4. Volume: 1,704.165 x 10^6 m^3.
5. Mean hydraulic retention time: 694 days (1.9 yr).

B. Tributary and Outlet:
(See Appendix B for flow data)

1. Tributaries -

Name	Drainage area (km^2)	Mean Flow (m^3/sec)
A-2 Salt River	11,152.5	25.01
Minor tributaries and immediate drainage -	3,870.9	6.95
Total	15,023.4	31.96

2. Outlet -

A-1 Salt River	15,084.2	28.42

C. Precipitation:

1. Year of sampling: 34.6 cm.
2. Mean annual: 35.9 cm.

III. LAKE WATER QUALITY SUMMARY

Theodore Roosevelt Lake was sampled three times during the open-water season of 1975 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from five stations on the lake and from a number of depths at each station (see map, page v). During each visit, depth-integrated samples were collected from each station for chlorophyll *a* analysis and phytoplankton identification and enumeration. During the first and last visits, 18.9-liter depth-integrated samples were composited for algal assays. Maximum depths sampled were 17.7 meters at Station 01, 23.8 meters at Station 02, 43.0 meters at Station 03, 38.7 meters at Station 04, and 15.2 meters at Station 05. For a more detailed explanation of NES methods, see NES Working Paper No. 175.

The results obtained are presented in full in Appendix C and are summarized in III-A for waters at the surface and at the maximum depth for each site. Results of the phytoplankton counts and chlorophyll *a* determinations are included in III-B. Results of the limiting nutrient study are presented in III-C.

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A. PHYSICAL AND CHEMICAL CHARACTERISTICS

PARAMETER	N*	(7/ 6/75) Sxxx = 5 RANGE	MEDIAN	MAX DEPTH RANGE (METERS)	N*	(8/17/75) Sxxx = 5 RANGE	MEDIAN	MAX DEPTH RANGE (METERS)	N*	(11/18/75) Sxxx = 5 RANGE	MEDIAN	MAX DEPTH RANGE (METERS)
TEMPERATURE (DEG CENT)												
0.-1.5 M DEPTH	1	4.4- 14.5	11.7	0.0- 1.5	10	22.3- 24.6	23.4	0.0- 1.5	10	15.6- 16.4	16.0	0.0- 1.5
MAX DEPTH**	-	7.8- 9.8	7.9	11.0- 32.0	5	9.7- 12.9	11.9	15.2- 43.0	5	13.1- 15.3	15.1	10.1- 36.0
DISSOLVED OXYG-N (MG/L)												
0.-1.5 M DEPTH	10	10.0- 11.8	11.3	0.0- 1.5	10	8.0- 9.2	8.5	0.0- 1.5	10	5.6- 7.4	6.9	0.0- 1.5
MAX DEPTH**	5	4.3- 9.0	7.8	11.0- 32.0	5	2.2- 6.0	3.4	15.2- 43.0	5	1.0- 8.6	6.8	10.1- 36.0
CONDUCTIVITY (UMHOS)												
0.-1.5 M DEPTH	10	450.-1449.	671.	0.0- 1.5	10	772.- 835.	792.	0.0- 1.5	10	784.- 949.	836.	0.0- 1.5
MAX DEPTH**	5	455.-1422.	620.	11.0- 32.0	5	810.-1009.	854.	15.2- 43.0	5	739.- 993.	803.	10.1- 36.0
PH (STANDARD UNITS)												
0.-1.5 M DEPTH	10	8.3- 8.8	8.5	0.0- 1.5	10	8.8- 9.0	8.9	0.0- 1.5	10	7.9- 8.3	8.1	0.0- 1.5
MAX DEPTH**	-	7.7- 8.1	8.0	11.0- 32.0	5	7.7- 8.3	7.8	15.2- 43.0	5	7.8- 8.2	8.1	10.1- 36.0
TOTAL ALKALINITY (MG/L)												
0.-1.5 M DEPTH	10	135.- 142.	138.	0.0- 1.5	10	98.- 103.	98.	0.0- 1.5	10	113.- 123.	118.	0.0- 1.5
MAX DEPTH**	5	135.- 147.	139.	11.0- 32.0	5	98.- 139.	127.	15.2- 43.0	5	115.- 136.	122.	10.1- 36.0
TOTAL P (MG/L)												
0.-1.5 M DEPTH	10	0.010-0.091	0.019	0.0- 1.5	10	0.017-0.041	0.019	0.0- 1.5	10	0.018-0.043	0.020	0.0- 1.5
MAX DEPTH**	5	0.011-0.026	0.019	11.0- 32.0	5	0.020-0.099	0.028	15.2- 43.0	5	0.019-0.072	0.020	10.1- 36.0
DISSOLVED ORTHO P (MG/L)												
0.-1.5 M DEPTH	10	0.002-0.007	0.003	0.0- 1.5	10	0.003-0.016	0.009	0.0- 1.5	10	0.005-0.015	0.008	0.0- 1.5
MAX DEPTH**	5	0.002-0.013	0.003	11.0- 32.0	5	0.003-0.027	0.014	15.2- 43.0	5	0.005-0.061	0.008	10.1- 36.0
NO2-NO3 (MG/L)												
0.-1.5 M DEPTH	10	0.020-0.020	0.020	0.0- 1.5	10	0.020-0.030	0.020	0.0- 1.5	10	0.020-0.020	0.020	0.0- 1.5
MAX DEPTH**	5	0.020-0.180	0.020	11.0- 32.0	5	0.020-0.160	0.030	15.2- 43.0	5	0.020-0.020	0.020	10.1- 36.0
AMMONIA (MG/L)												
0.-1.5 M DEPTH	10	0.020-0.040	0.020	0.0- 1.5	10	0.020-0.100	0.030	0.0- 1.5	10	0.020-0.030	0.020	0.0- 1.5
MAX DEPTH**	5	0.020-0.020	0.020	11.0- 32.0	5	0.030-0.050	0.040	15.2- 43.0	5	0.020-0.120	0.020	10.1- 36.0
KJELDAHL N (MG/L)												
0.-1.5 M DEPTH	10	0.200-0.700	0.200	0.0- 1.5	10	0.200-1.600	0.300	0.0- 1.5	10	0.200-0.200	0.200	0.0- 1.5
MAX DEPTH**	5	0.200-0.300	0.200	11.0- 32.0	5	0.200-0.200	0.200	15.2- 43.0	5	0.200-0.200	0.200	10.1- 36.0
SECCHI DISC (METERS)												
	5	1.1- 2.0	1.5		5	1.8- 2.1	2.0		5	1.5- 2.1	2.1	

* N = NO. OF SAMPLES
** MAXIMUM DEPTH SAMPLED AT EACH SITE
*** S = NO. OF SITES SAMPLED ON THIS DATE

B. Biological Characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal Units Per ml
03/05/75	1. Chroomonas?	1,343
	2. Dactylococcopsis	564
	3. Cryptomonas	322
	4. Glenodinium	161
	5. Ankistrodesmus	54
	Other genera	189
	Total	2,633
06/17/75	1. Pennate diatom	488
	2. Tetraedron	234
	3. Ankistrodesmus	195
	4. Chroomonas?	156
	5. Anabaenopsis	117
	Other genera	313
	Total	1,503
11/18/75	1. Chroomonas?	639
	2. Kirchneriella	486
	3. Dactylococcopsis	256
	4. Scenedesmus	102
	5. Fragilaria	102
	Other genera	563
	Total	2,148

2. Chlorophyll a -

Sampling Date	Station Number	Chlorophyll a (µg/l)
03/04,05/75	01	4.0
	02	6.8
	03	2.3
	04	3.3
	05	3.8
06/17,18/75	01	3.8
	02	3.9
	03	5.2
	04	4.0
	05	4.0
11/18/75	01	5.7
	02	4.0
	03	2.7
	04	3.6
	05	4.0

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum Yield (mg/l-dry wt.)
a. 03/05/75 Staitons 01-03			
Control	0.005	0.048	0.3
0.05 P	0.055	0.048	2.9
0.05 P + 1.0 N	0.055	1.048	16.8
1.00 N	0.005	1.048	0.2
Stations 04,05			
Control	0.005	0.056	0.2
0.05 P	0.055	0.056	2.4
0.05 P + 1.0 N	0.055	1.056	18.6
1.00 N	0.005	1.056	0.2
b. 11/18/75 Stations 01,02			
Control	0.010	0.055	0.3
0.05 P	0.060	0.055	3.1
0.05 P + 1.0 N	0.060	1.055	9.7
1.00 N	0.010	1.055	0.3
Stations 03-05			
Control	0.015	0.045	1.7
0.05 P	0.065	0.045	3.1
0.05 P + 1.0 N	0.065	1.045	13.4
1.00 N	0.015	1.045	1.2

2. Discussion -

The control yields of the assay alga, Selenastrum capricornutum*, indicate that the potential for primary production in Theodore Roosevelt Lake was moderately low on both sampling occasions (03/05/75, 11/18/75) except at Stations 03-05 during November, when it was relatively high. In all assays, the addition of phosphorus spikes alone resulted in a significant increase in yield over that of the control, indicating primary limitation by phosphorus in the lake. In all assays the addition of nitrogen alone did not produce a growth response, and the maximum increase in yield over that of the control was achieved with the simultaneous addition of both phosphorus and nitrogen spikes.

The mean inorganic nitrogen to orthophosphorus ratios (N/P) in the lake data were approximately 12/1 or less on all sampling occasions, suggesting primary limitation by nitrogen.

*For further information regarding the algal assay test procedure and selection of test organisms, see U.S. Environmental Protection Agency (1971).

IV. NUTRIENT LOADINGS
(See Appendix D for data)

For the determination of nutrient loadings, the Arizona National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page v), except for the high runoff months of April and May when two samples were collected. Sampling was begun in December 1974, and was completed in November 1975.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Arizona District Office of the USGS for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a USGS computer program for calculating stream loadings. Nutrient loads indicated for tributaries are those measured minus known point source loads, if any.

Nutrient loadings for unsampled "minor tributaries and immediate drainage" ("ZZ" of USGS) were estimated by using the mean annual concentrations in Salome Creek at Station G-1 and mean annual ZZ flow.

The operators of the Globe, Miami Inspiration Hospital, Cobre Valley Shopping Center and Holgate wastewater treatment plants provided monthly effluent samples and corresponding flow data. Nutrient loads for the Miami Municipal, Miami High School, and Roosevelt Marina wastewater treatment plants were calculated using provided monthly chemistry data and estimated flows.

A. Waste Sources:

1. Known municipal -

Name	Pop.* Served	Treatment*	Mean Flow ($m^3/d \times 10^3$)	Receiving Water
Globe	7,000	Stabilization Pond	2.467	Pinal Creek
Miami Inspiration Hospital	200	Activated Sludge	0.072	Pinal Creek
Cobre Valley Shopping Center	300	Activated Sludge	0.024	Pinal Creek
Miami Municipal	3,800	Stabilization Pond	1.438**	Pinal Creek
Miami High School	800	Activated Sludge	0.303**	Pinal Creek
Holgate	?	Activated Sludge	0.036	Pinal Creek
Roosevelt Marina	100	Activated Sludge	0.038**	Roosevelt Lake

2. Known industrial - None

*Provided by treatment plant operator.
**Estimated at 0.3785 m^3/capita/day.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source		kg P/yr	% of total
a.	Tributaries (nonpoint load) -		
	A-2 Salt River	104,680	82.8
b.	Minor tributaries and immediate drainage (nonpoint load) -	5,700	4.5
c.	Known municipal STP's -		
	Globe	11,070	8.8
	Miami Inspiration Hospital	115	0.1
	Cobre Valley Shopping Center	15	<0.1
	Miami Municipal	1,805	1.4
	Miami High School	1,770	1.4
	Holgate	175	0.1
	Roosevelt Marina	100	0.1
d.	Septic tanks - None known		
e.	Known industrial - None		
f.	Direct precipitation* -	1,060	0.8
	Total	126,490	100.0%

2. Outputs - A-1 Salt River 22,380

3. Net annual P accumulation - 104,110

*Estimated (See NES Working Paper No. 175).

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source		kg N/yr	% of total
a.	Tributaries (nonpoint load) -		
	A-2 Salt River	473,010	69.8
b.	Minor tributaries and immediate drainage (nonpoint load) -	92,275	13.6
c.	Known municipal STP's -		
	Globe	30,345	4.5
	Miami Inspiration Hospital	395	0.1
	Cobre Valley Shopping Center	100	<0.1
	Miami Municipal	13,055	1.9
	Miami High School	2,840	0.4
	Holgate	130	<0.1
	Roosevelt Marina	380	<0.1
d.	Septic tanks - None known		
e.	Known industrial - None		
f.	Direct precipitation* -	65,530	9.7
	Total	678,060	100.0%
2.	Outputs - A-1 Salt River	401,180	
3.	Net annual N accumulation -	276,880	

*Estimated (See NES Working Paper No. 175).

D. Mean Annual Nonpoint Nutrient Export by Subdrainage Area:

Tributary	kg P/km^2/yr	kg N/km^2/yr
A-2 Salt River	9	42

E. Mean Nutrient Concentrations in Ungaged Streams:

Tributary	Mean Total P (mg/l)	Mean Total N (mg/l)
E-1 Pinal Creek	0.110	0.879
F-1 Pinto Creek	0.828	1.518
G-1 Salome Creek	0.026	0.421
H-1 Tonto Creek	0.061	0.529

F. Yearly Loadings:

In the following table, the existing phosphorus annual loading is compared to the relationship proposed by Vollenweider (1975). Essentially, his "eutrophic" loading is that at which the receiving waters would become eutrophic or remain eutrophic; his "oligotrophic" loading is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A "mesotrophic" loading would be considered one between "eutrophic" and "oligotrophic".

Note that Vollenweider's model may not apply to lakes with short hydraulic retention times or in which light penetration is severely restricted by high concentrations of suspended solids in the surface waters.

	Total Yearly Phosphorus Loading ($g/m^2/yr$)
Estimated loading for Theodore Roosevelt Lake	2.08
Vollenweider's "eutrophic" loading	0.71
Vollenweider's "oligotrophic" loading	0.36

V. LITERATURE REVIEWED

Rathbun, Ned L. 1974. Personal Communication (lake morphometry). Arizona Game and Fish Department, Phoenix, Arizona.

Shafer, W. H. 1977. Personal Communication (lake nutrient loadings and fluctuating lake levels. Arizona Department of Health Services, Phoenix, Arizona.

U.S. Environmental Protection Agency. 1971. Algal Assay Procedure Bottle Test. National Eutrophication Research Program, Corvallis, Oregon.

U.S. Environmental Protection Agency. 1975. National Eutrophication Survey Methods 1973-1976. Working Paper No. 175. National Environmental Research Center, Las Vegas, Nevada, and Pacific Northwest Environmental Research Laboratory, Corvallis, Oregon.

Vollenweider, R. A. 1975. Input-Output Models With Special Reference to the Phosphorus loading Concept in Limnology Schweiz. Z. Hydrol. 37:53-84. m

VI. APPENDICES

APPENDIX A

CONVERSION FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

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APPENDIX B

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR ARIZONA 11/26/76

LAKE CODE 0410 THEODORE ROOSEVELT LAKE

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 15084.2

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
0410A1	15084.2	42.48	28.32	33.98	36.81	45.31	39.64	33.98	28.32	22.65	15.57	2.27	11.33	28.42
0410A2	11152.5	26.90	28.32	39.64	56.63	33.98	10.48	7.36	15.29	11.89	24.35	11.33	33.98	25.01
0410ZZ	3931.6	12.74	10.76	14.72	7.93	2.27	0.57	0.99	1.98	3.40	6.23	3.40	18.41	6.95

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 15084.2
SUM OF SUB-DRAINAGE AREAS = 15084.2

TOTAL FLOW IN = 383.55
TOTAL FLOW OUT = 340.65

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
0410A1	12	74	0.028	8	0.028				
	1	75	1.416	11	0.028				
	2	75	4.531	16	0.028				
	3	75	13.875	13	31.149				
	4	75	7.362	12	0.028	30	0.028		
	5	75	35.113	10	43.325	30	47.572		
	6	75	45.873	14	44.741				
	7	75	44.741	9	47.572				
	8	75	45.873	5	45.024				
	9	75	28.317	11	32.564				
	10	75	9.061	19	0.028				
	11	75	0.028	17	0.028				
0410A2	12	74	6.371	8	7.419				
	1	75	6.258	11	6.739				
	2	75	13.451	16	38.228				
	3	75	60.711	13	101.941				
	4	75	44.044	12	91.463	30	92.879		
	5	75	49.554	10	47.855	30	27.354		
	6	75	13.507	14	13.309				
	7	75	9.175	9	13.451				
	8	75	5.125	5	5.380				
	9	75	9.486	11	25.287				
	10	75	4.219	19	3.936				
	11	75	4.361	17	4.361				
0410ZZ	12	74	0.850						
	1	75	0.850						
	2	75	2.549						
	3	75	11.327						
	4	75	16.990						
	5	75	1.982						
	6	75	0.566						
	7	75	1.416						
	8	75	0.283						
	9	75	0.566						
	10	75	0.425						
	11	75	0.708						

APPENDIX B TRIBUTARY FLOW DATA

SSS 23<

APPENDIX C

PHYSICAL AND CHEMICAL DATA

STORET RETRIEVAL DATE 76/11/26
NATL EUTROPHICATION SURVEY
EPA-LAS VEGAS

041001
33 40 06.0 111 03 51.0 3
ROOSEVELT LAKE
04007 ARIZONA

110491

11EPALES 2111202
0040 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/03/04	15 20	0000	14.5	11.6	48	1447	8.75	137	0.020	0.700	0.020K	0.007
	15 20	0005	14.5	11.2		1449	8.75	137	0.020K	0.200	0.020K	0.005
	15 20	0015	12.2	11.4		1449	8.70	137	0.020K	0.200K	0.020K	0.003
	15 20	0025	10.2	8.4		1394	8.20	139	0.020	0.200K	0.040	0.003
	15 20	0036	9.8	7.6		1422	8.10	140	0.020K	0.300	0.020K	0.003
75/06/17	15 15	0000	24.4	8.4		791	9.00	99	0.050	0.300	0.020K	0.014
	15 15	0005	24.4	8.0		790	9.00	96	0.030	0.300	0.020K	0.013
	15 15	0015	24.4	7.8		790	9.00	96	0.030	0.300	0.020K	0.013
	15 15	0026	11.4	3.0		700	8.05	101	0.050	0.200	0.020K	0.015
	15 15	0040	14.5	2.8		678	7.80	125	0.040	0.200	0.020K	0.024
	15 15	0058	11.6	2.4		810	7.70	127	0.040	0.200	0.030	0.027
75/11/18	10 40	0000	15.9	7.4	65	925	8.20	113	0.030	0.200K	0.020K	0.006
	10 40	0005	16.0	7.4		969	8.25	113	0.020K	0.200K	0.020K	0.005
	10 40	0024	15.7	7.0		920	8.20	115	0.020K	0.200K	0.020K	0.005
	10 40	0038	15.3	7.4		992	8.20	116	0.020K	0.200K	0.020K	0.005

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/03/04	15 20	0000	0.051	4.0	
	15 20	0005	0.021		
	15 20	0015	0.013		
	15 20	0025	0.012		
	15 20	0036	0.013		
75/06/17	15 15	0000	0.025	3.6	
	15 15	0005	0.020		
	15 15	0015	0.022		
	15 15	0026	0.023		
	15 15	0040	0.033		
	15 15	0058	0.036		
75/11/18	10 40	0000	0.023	5.7	
	10 40	0005	0.023		
	10 40	0024	0.019		
	10 40	0038	0.020		

K VALUE KNOWN TO BE LESS THAN INDICATED

25

STORET RETRIEVAL DATE 76/11/26
NATL EUTROPHICATION SURVEY
EPA-LAS VEGAS

041002
33 40 47.0 111 06 25.0 3
ROOSEVELT LAKE
04007 ARIZONA

110491

11EPALES 2111202
0048 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/03/05	09 50	0000	11.7	11.4	80	703	8.55	140	0.040	0.400	0.020K	0.007
	09 50	0005	11.8	11.8		753	8.60	138	0.020K	0.200	0.020K	0.003
	09 50	0011	11.6	11.6		736	8.55	136	0.020K	0.200	0.020K	0.003
	09 50	0020	8.8	10.2		629	8.30	135	0.020K	0.200K	0.020K	0.002
	09 50	0035	8.3	9.0		644	8.10	135	0.020K	0.200K	0.020K	0.002
	09 50	0045	8.2	9.0		681	8.10	135	0.020K	0.200K	0.020K	0.002
75/06/17	14 45	0000	24.2	8.8		782	9.00	97	0.020	0.500	0.020K	0.009
	14 45	0005	24.6	8.6		785	9.00	99	0.040	0.400	0.020K	0.016
	14 45	0015	22.2	8.4		784	9.00	100	0.030	0.200K	0.020K	0.010
	14 45	0035	17.5	4.2		707	8.10	115	0.040	0.200K	0.020K	0.016
	14 45	0060	11.3	3.4		840	7.95	98	0.040	0.200K	0.020K	0.013
75/11/18	11 10	0000	16.4	7.0	84	905	8.15	118	0.020	0.200K	0.020K	0.007
	11 10	0005	16.3	7.0		921	8.10	116	0.020	0.200K	0.020K	0.007
	11 10	0025	16.3	6.4		929	8.10	118	0.020	0.200K	0.020K	0.007
	11 10	0050	16.2	6.6		933	8.10	125	0.020	0.200K	0.020K	0.009
	11 10	0078	15.1	6.8		993	8.10	122	0.020	0.200K	0.020K	0.006

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT PENNING PERCENT
75/03/05	09 50	0000	0.025	6.8	
	09 50	0005	0.014		
	09 50	0011	0.013		
	09 50	0020	0.012		
	09 50	0035	0.011		
	09 50	0045	0.011		
75/06/17	14 45	0000	0.024	3.9	
	14 45	0005	0.026		
	14 45	0015	0.021		
	14 45	0035	0.020		
	14 45	0060	0.024		
75/11/18	11 10	0000	0.018	4.0	
	11 10	0005	0.019		
	11 10	0025	0.019		
	11 10	0050	0.026		
	11 10	0078	0.019		

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 76/11/26
NATL EUTROPHICATION SURVEY
EPA-LAS VEGAS

041003
33 40 18.0 111 09 34.0 3
ROOSEVELT LAKE
04007 ARIZONA

110491

11EPALES 2111202
0068 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/03/05	10 37	0000	12.0	11.6	78	747	8.50	135	0.020K	0.500	0.020K	0.003
	10 37	0005	11.7	10.2		638	8.50	135	0.020K	0.200K	0.020K	0.002
	10 37	0015	12.0	10.8		623	8.45	134	0.020K	0.200K	0.020K	0.002
	10 37	0023	8.2	9.0		520	8.20	134	0.020K	0.200K	0.020K	0.003
	10 37	0035	8.1	9.0		510	8.15	134	0.020	0.200K	0.020K	0.004
	10 37	0050	8.0	8.8		545	8.10	134	0.020	0.200K	0.030	0.005
	10 37	0063	7.9	8.6		592	8.00	138	0.020	0.200K	0.040	0.005
75/06/17	14 00	0000	23.6	9.0		793	8.80	103	0.100	1.600	0.030	0.009
	14 00	0005	23.2	9.2		776	8.90	99	0.040	0.200	0.020K	0.009
	14 00	0015	20.3	8.5		761	8.60	113	0.040	0.200	0.020K	0.011
	14 00	0035	11.7	4.6		835	7.90	122	0.030	0.200K	0.030	0.012
	14 00	0070	11.1	4.6		860	7.90	129	0.030	0.200K	0.020	0.009
	14 00	0110	10.3	4.0		912	7.80	134	0.020K	0.200K	0.060	0.009
	14 00	0141	9.7	2.2		953	7.80	139	0.050	0.200	0.160	0.022
75/11/18	13 35	0000	16.2	6.8	84	835	8.10	116	0.020K	0.200K	0.020K	0.010
	13 35	0005	16.1	6.2		837	8.10	118	0.020	0.200K	0.020K	0.015
	13 35	0027	16.0	6.2		817	8.00	117	0.020	0.200K	0.020K	0.014
	13 35	0050	15.7	6.2		809	8.00	117	0.030	0.200K	0.020K	0.014
	13 35	0080	15.0	2.0		739	7.80	129	0.120	0.200	0.020K	0.048
	13 35	0118	13.1	1.6		734	7.65	136	0.060	0.200	0.020K	0.061

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/03/05	10 37	0000	0.015	2.3	
	10 37	0005	0.014		
	10 37	0015	0.015		
	10 37	0023	0.010		
	10 37	0035	0.010		
	10 37	0050	0.012		
	10 37	0063	0.021		
75/06/17	14 00	0000	0.041	5.2	
	14 00	0005	0.019		
	14 00	0015	0.024		
	14 00	0035	0.017		
	14 00	0070	0.021		
	14 00	0110	0.053		
	14 00	0141	0.099		
75/11/18	13 35	0000	0.043	2.7	
	13 35	0005	0.020		
	13 35	0027	0.021		

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 76/11/26
NATL EUTROPHICATION SURVEY
EPA-LAS VEGAS

041004
33 42 06.0 111 10 00.0 3
ROOSEVELT LAKE
04007 ARIZONA

110491

11EPALES 2111202
0110 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/03/05	11	20 0000	10.8	10.8	60	564	8.50	138	0.020K	0.300	0.020K	0.003
	11	20 0005	10.1	11.2		510	8.50	137	0.020K	0.200K	0.020K	0.003
	11	20 0015	8.8	10.2		432	8.35	135	0.020K	0.200K	0.020K	0.003
	11	20 0025	8.1	9.0		325	8.10	135	0.020K	0.200K	0.020K	0.002
	11	20 0045	8.0	8.6		531	8.10	137	0.020K	0.200K	0.020	0.003
	11	20 0060	7.7	8.6		552	8.00	138	0.020	0.200K	0.030	0.004
	11	20 0090	8.0	7.2		634	7.90	140	0.020	0.200K	0.060	0.009
	11	20 0105	7.9	4.3		620	7.70	147	0.020	0.200K	0.180	0.013
75/08/18	10	15 0000	22.3	8.4	84	810	8.80	98	0.030	0.200	0.020K	0.003
	10	15 0005	22.5	8.6		801	8.80	98	0.030	0.200K	0.020K	0.010
	10	15 0015	22.3	8.2		795	8.80	97	0.030	0.300	0.020K	0.010
	10	15 0031	14.2	3.8		774	8.05	113	0.020	0.200K	0.020K	0.010
	10	15 0060	11.2	4.6		864	7.80	128	0.020	0.200K	0.020K	0.012
	10	15 0095	10.3	3.2		1003	7.80	135	0.060	0.300	0.060	0.027
	10	15 0127	10.1	4.0		1009	7.80	138	0.030	0.200	0.080	0.014
75/11/18	14	00 0000	16.0	6.6	84	812	7.90	123	0.020	0.200K	0.020K	0.013
	14	00 0005	16.0	6.8		825	8.00	123	0.020K	0.200K	0.020K	0.013
	14	00 0015	16.0	6.6		818	8.00	123	0.020	0.200K	0.020K	0.008
	14	00 0030	15.9	6.6		820	8.00	124	0.020K	0.200K	0.020K	0.011
	14	00 0060	15.9	6.8		830	8.00	124	0.020K	0.200K	0.020K	0.016
	14	00 0098	13.5	1.0		751	7.60	133	0.120	0.200	0.020K	0.054

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 76/11/26
NATL EUTROPHICATION SURVEY
EPA-LAS VEGAS

04100A
33 42 06.0 111 10 00.0 3
ROOSEVELT LAKE
0400? ARIZONA

110491

11EPALES 2111202
0110 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/03/05	11	20 0000	0.019	3.3	
	11	20 0005	0.019		
	11	20 0015	0.017		
	11	20 0025	0.014		
	11	20 0045	0.016		
	11	20 0060	0.017		
	11	20 0080	0.021		
	11	20 0105	0.026		
75/06/18	10	15 0000	0.019	4.0	
	10	15 0005	0.017		
	10	15 0015	0.018		
	10	15 0031	0.020		
	10	15 0060	0.021		
	10	15 0095	0.046		
	10	15 0127	0.028		
75/11/18	14	00 0000	0.021	3.6	
	14	00 0005	0.020		
	14	00 0015	0.019		
	14	00 0030	0.022		
	14	00 0060	0.036		
	14	00 0098	0.072		

K VALUE KNOWN TO BE LESS
THAN INDICATED

29

STORET RETRIEVAL DATE 76/11/26
NATL EUTROPHICATION SURVEY
EPA-LAS VEGAS

041005
33 44 32.0 111 12 05.0 3
ROOSEVELT LAKE
04007 ARIZONA

110491

11EPALES 2111202
0041 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
75/03/05	12 15	0000	9.3	11.6	42	450	8.40	142	0.020K	0.200K	0.020K	0.004
	12 15	0005	8.4	10.0		550	8.30	138	0.020K	0.200K	0.020K	0.002
	12 15	0015	8.2	9.2		370	8.20	137	0.020K	0.200K	0.020K	0.003
	12 15	0025	7.7	9.2		459	8.15	137	0.020K	0.200K	0.020K	0.003
	12 15	0037	7.8	7.6		455	7.95	139	0.020K	0.200K	0.020K	0.003
75/06/18	09 45	0000	23.6	6.0	72	835	8.85	98	0.030	0.300	0.020	0.008
	09 45	0005	23.6	8.2		834	8.85	97	0.030	0.200	0.020K	0.009
	09 45	0015	23.6	8.0		829	8.85	97	0.020	0.200	0.020K	0.008
	09 45	0027	20.7	3.4		802	8.15	110	0.040	0.300	0.020K	0.014
	09 45	0040	14.8	2.0		804	7.85	123	0.040	0.200K	0.020K	0.005
	09 45	0050	12.4	6.0		854	8.25	98	0.050	0.200K	0.020K	0.003
75/11/18	14 25	0000	15.4	5.6	60	784	8.00	119	0.020	0.200K	0.020K	0.008
	14 25	0005	15.5	7.4		809	8.10	117	0.020K	0.200K	0.020K	0.007
	14 25	0015	15.5	7.8		832	8.10	116	0.020K	0.200K	0.020K	0.008
	14 25	0033	15.3	8.6		803	8.10	115	0.020K	0.200K	0.020K	0.006

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
75/03/05	12 15	0000	0.022	3.8	
	12 15	0005	0.019		
	12 15	0015	0.016		
	12 15	0025	0.016		
	12 15	0037	0.019		
75/06/18	09 45	0000	0.019	4.0	
	09 45	0005	0.019		
	09 45	0015	0.019		
	09 45	0027	0.037		
	09 45	0040	0.024		
	09 45	0050	0.020		
75/11/18	14 25	0000	0.018	4.0	
	14 25	0005	0.019		
	14 25	0015	0.020		
	14 25	0033	0.020		

K VALUE KNOWN TO BE LESS THAN INDICATED

V-88-30<

APPENDIX D

TRIBUTARY AND WASTEWATER TREATMENT PLANT DATA

STORET RETRIEVAL DATE 76/11/30
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0410A1
33 40 15.0 111 09 41.0 4
SALT RIVER
04 7.5 TED RSVLT DM
O/THEODORE ROOSEVELT LK 110491
BELO TH DAM .9 MI SW OF GOVT HILL
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/12/08	15	20	0.064	0.300	0.010	0.020	0.020
75/01/11	13	15	0.056	0.200	0.018	0.015	0.010
75/02/16	10	20	0.101	0.200	0.008	0.016	0.016
75/03/13	16	15	0.104	0.150	0.028	0.016	0.030
75/04/12	09	20	0.055	0.600	0.025	0.015	0.040
75/04/30	16	00	0.020	1.000	0.030	0.010	0.030
75/05/10	15	10	0.095	0.250	0.020	0.015	0.015
75/05/30	09	35	0.115	0.150	0.010	0.015	0.020
75/06/14	15	48	0.080	0.150	0.015	0.015	0.030
75/07/10	18	15	0.020	0.550	0.015	0.015	0.020
75/08/05	16	30	0.055	0.250	0.030	0.020	0.060
75/09/11	11	00	0.050	0.400	0.020	0.030	0.050
75/10/19			0.055	0.100K	0.010	0.030	0.040
75/11/17			0.095	0.200	0.020	0.025	0.025

APPENDIX A
TRIBUTARY AND WASTEWATER
TREATMENT PLANT DATA

> 32

STORET RETRIEVAL DATE 76/11/30
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0410A2
33 37 40.0 110 56 05.0 4
SALT RIVER
04 .5 ROCKINSTRAW M
T/THEODORE ROOSEVELT LK 110491
BNK 4.1 MI N APCH TR JCT
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/12/08	14	10	0.008	0.200	0.015	0.010	0.020
75/01/11	12	00	0.008	0.100	0.016	0.005K	0.010K
75/02/16	11	15	0.008	0.800	0.016	0.024	0.337
75/03/13	16	45	0.040	1.300	0.040	0.072	0.400
75/04/12	09	30	0.020	1.100	0.070	0.065	0.420
75/04/30	16	20	0.035	0.750	0.015	0.020	0.200
75/05/10	14	50	0.010	0.500	0.015	0.030	0.050
75/05/30	10	55	0.010	0.100	0.015	0.025	0.030
75/06/14	14	18	0.005	0.050	0.020	0.015	0.015
75/07/09	18	40	0.005	0.950	0.030	0.015	0.080
75/08/05	09	55	0.055	1.150	0.035	0.025	0.240
75/09/11	11	15	0.360		0.125	0.070	
75/10/19			0.005	0.150	0.007	0.005	0.040
75/11/17			0.005	0.100	0.010	0.005	0.010K

K-VALUE KNOWN TO BE LESS THAN INDICATED

33

STORET RETRIEVAL DATE 76/11/30
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0410E1
33 35 45.0 110 54 40.0 4
PINAL CREEK
04 15 ROOSEVELT LK 110491
T/THEODORE ROOSEVELT LK 110491
BNK 2 MI ABOVE CONFLNCE WITH SALT RIVER
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/12/08	14	20	0.256	0.500	0.025	0.025	0.080
75/01/11	12	15	0.256	0.500	0.032	0.025	0.130
75/02/16	10	40	0.264	0.300	0.016	0.024	0.050
75/03/13	16	35	0.256	0.100K	0.032	0.024	0.070
75/04/12	09	40	0.280	0.475	0.450	0.025	0.120
75/04/30	16	15	0.085	1.050	0.030	0.005K	0.160
75/05/10	14	55	0.125	0.500	0.030	0.020	0.220
75/05/30	09	45	0.045	0.050K	0.010	0.010	0.010
75/06/14	14	18	0.045	0.050K	0.020	0.200	0.210
75/07/09	18	20	0.025	0.500	0.020	0.005K	0.025
75/08/05	09	30	0.035	0.500	0.055	0.005K	0.030
75/09/11	11	30	0.390	1.600	0.040	0.060	
75/10/19			0.270	0.100	0.015	0.030	0.140
75/11/17			0.260	1.400	0.180	0.050	0.190

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 76/11/30
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0410EB AS0410EB P000200
33 24 00.0 110 53 00.0 4
MIAMI INSPIRATION MOS.
04 7.5 INSPIRATION
T/ROOSEVELT LAKE 110491
PINAL RIVER
11EPALES 2141204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
75/02/23			8.450	1.800	0.200	4.300	4.300	0.020	0.020
75/03/24	08 00								
CP(T)-			12.600	3.000	0.080K	3.900	4.100	0.033	0.016
75/03/25	04 00								
75/05/29	12 00		17.300	4.400	0.050	5.020	5.200	0.016	0.018
75/06/24	08 00								
CP(T)-			13.200	2.700	0.025K	5.500	5.700	0.015	0.028
75/06/25	08 00								
75/07/21	08 00								
CP(T)-			3.800	1.800	0.100	2.900	3.110	0.015	0.017
75/07/22	08 00								
75/08/25	08 00								
CP(T)-			17.600	4.100	0.075	5.600	5.600	0.024	0.022
75/08/26	04 00								
75/10/30	12 00								
CP(T)-			13.000	2.400	0.150	3.400	4.000	0.021	0.016
75/10/31	08 00								
75/11/25	08 00		9.400	3.200	0.300	3.200	3.600	0.014	0.021
75/12/30	12 00								
CP(T)-			10.000	2.200		3.700	3.700	0.012	0.013
75/12/31	08 00								

STORET RETRIEVAL DATE 76/11/30
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0410EC AS0410EC P000300
33 24 00.0 110 52 00.0 4
COBRE VALLEY SHOPPING
04 7.5 INSPIRATION
T/ROOSEVELT LAKE 11J491
PINAL RIVER
11EPALES 2141204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
75/06/25	16 00		7.800	2.600	0.025K	1.060	1.190	0.006	0.006
75/06/30			6.700	0.800	0.030	0.680	0.800	0.006	0.006
75/07/20	16 00		9.450	0.750	0.054	0.830	0.990	0.007	0.007
75/07/31	16 00		9.600	1.700	0.025K	0.875	1.000	0.006	0.006
75/08/15	16 00		10.500	1.800	0.130	0.975	1.100	0.005	0.005
75/08/31	16 00		10.500	2.000	0.025K	1.250	1.250	0.005	0.006
75/09/15	16 00		13.000	1.500	0.084	1.200	1.400	0.004	0.004
75/09/30	16 00		11.500	1.000K	0.100K	1.150	1.400	0.005	0.005
75/10/15	16 00		15.000	2.800	0.100	1.475	1.800	0.006	0.003
75/10/20	10 00		11.500	0.100	0.300	1.350	1.430	0.006	0.006
75/11/15	16 00		19.800	3.800	0.025K	3.150	3.300	0.006	0.010
75/11/30	16 00		0.100	2.600	0.031	0.100	0.390	0.007	0.007
75/12/15	16 00		5.400	4.150	0.025K	2.780	3.600	0.012	0.009
75/12/30	16 00		0.050	1.900	0.075	3.125	3.500	0.006	0.010

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 76/11/30
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0410F1
33 35 57.0 111 00 00.0 4
PINTO CREEK
04007 7.5 HCKNSTR MT
T/THEODORE ROOSEVELT LK
APACHE TRAIL BRDG 10 MI E OF ROOSEVELT
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
75/02/16	10	45	0.120	1.200	0.032	0.056	0.310
75/03/13	16	25	0.056	0.500	0.024	0.032	0.420
75/04/12	09	25	0.055	0.400	0.050	0.035	0.280
75/07/09	07	15	0.340	3.400	0.050	0.138	2.300

STORET RETRIEVAL DATE 76/11/30
NATL EUTHOPHICATION SURVEY
EPA- LAS VEGAS

0410G1
33 44 06.0 111 06 45.0 4
SALOME CREEK
04 7.5 WINDY HILL
T/THEODORE ROOSEVELT LK 110491
CROSS RD BRDG 5.4 MI NW OF ROOSEVELT DAM
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/12/08	14	40	0.016	0.400	0.010	0.005	0.010
75/01/11	12	30	0.008	0.200	0.008	0.005	0.010K
75/02/16	11	00	0.024	0.400	0.016	0.028	0.045
75/03/13	16	55	0.008	0.500	0.012	0.008	0.040
75/04/12	10	40	0.005	0.300	0.020	0.015	0.030
75/04/30	16	30	0.005	0.500	0.010	0.005K	0.020
75/05/10	14	35	0.010	0.400	0.010	0.005	0.010K
75/05/30	10	10	0.010	0.900	0.015	0.005	0.010K
75/06/14	14	32	0.005	0.100	0.015	0.010	0.010

K VALUE KNOWN TO BE LESS
THAN INDICATED

STORET RETRIEVAL DATE 76/11/30
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0410M1
33 47 07.0 111 15 45.0 4
TONTO CREEK
04 7.5 TONTO BASIN
T/THEODORE ROOSEVELT LK 110491
BNK 7 MI SE OF PUMPKIN CENTER
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/12/08	14 55		0.024	0.500	0.010	0.010	0.010
75/01/11	13 02		0.008	0.300	0.008	0.005K	0.010K
75/02/16	11 30		0.008	0.300	0.014	0.008	0.010K
75/03/13	17 00		0.024	0.800	0.024	0.024	0.170
75/04/12	11 40		0.030	1.000	0.020	0.025	0.160
75/04/30	16 40		0.015	0.650	0.010	0.005K	0.020
75/05/10	14 20		0.010	0.100	0.015	0.010	0.010
75/05/30	10 20		0.010	0.050K	0.005	0.010	0.010
75/06/14	14 45		0.010	0.050K	0.015	0.005	0.010K
75/07/09	18 30		0.300		0.035	0.085	
75/11/17			0.060	0.400	0.015	0.015	0.050

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 76/11/30
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0410EA P0D410EA P007000
33 24 00.0 110 47 00.0 4
GLOBE
04 7.5 GLOBE
T/ROOSEVELT LAKE 110491
PINAL RIVER
11EPALES 2141204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
75/06/17			0.150	26.000	3.600	4.000	12.000	0.700	0.700
75/07/07	14 00		0.025	18.000	7.800	4.700	10.000	0.750	0.720
75/08/05	15 00		0.100	40.000	7.750	5.400	11.500	0.800	0.750
75/09/02	16 45		0.025	21.000	7.600	9.300	10.500	0.750	0.700
75/09/30	15 00		0.100	32.000	11.000	6.200	11.000	0.800	0.750
75/11/04	13 15		0.065	33.000	7.800	9.600	24.000	0.850	0.800
75/12/08	12 10		0.125	35.000	15.500	10.000	11.800	0.740	0.700
76/01/19	12 45		0.025	30.000	20.000	7.900	12.500	0.780	0.750
76/02/23	15 30		0.175	31.000	13.700	5.400	11.500	0.800	0.620
76/04/12	13 40			23.000			15.000	0.350	0.325
76/05/06	14 30			26.500			11.000	0.362	0.355

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STORET RETRIEVAL DATE 76/11/30
NATL EUTHOPHICATION SURVEY
EPA- LAS VEGAS

0410ED PD0410ED P003800
33 24 00.0 110 53 00.0 4
MIAMI MUNICIPAL
04007 7.5 INSPIRATION
T/ROOSEVELT LAKE
PINAL CREEK
11EPALES 2141204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
75/02/25	15 00		0.080	30.000	26.500	0.190	0.340		
75/03/31	09 30		1.040	25.000	17.000	0.130	0.170		
75/04/25	13 30		0.200	18.000	14.000		0.380		
75/05/27	13 30		0.150	10.500	5.900	0.083	0.200		
75/06/24	08 30		0.150	15.000	3.200	0.140	0.600		
75/07/26	10 00		0.050	7.900	2.800	1.350	6.200		
75/08/25	13 30		0.325	17.000	4.800	1.570	2.600		
75/09/26	08 00		0.025	31.500	11.000	1.400	6.300		
75/10/27	09 30		0.050	32.000	17.000	4.300	7.700		
75/11/26	08 00		0.050	36.000	22.000	9.800	10.000		
75/12/29	13 30		0.052	36.000	20.000	3.300	4.100		
76/01/29	09 00		0.150	37.000	37.000	0.120	2.400		

STORET RETRIEVAL DATE 76/11/30
NATL EUTHOPHICATION SURVEY
EPA- LAS VEGAS

0410EE AS0410EE P000800
33 23 00.0 110 52 30.0 4
MIAMI HIGH SCHOOL
04 7.5 INSPIRATION
T/ROOSEVELT LAKE 110491
PINAL RIVER
11EPALES 2141204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
75/04/15	11	00							
CP(T)-			0.960	15.000	0.310	0.400	13.000		0.006
75/04/15	15	00							
75/05/15	11	00							
CP(T)-			0.050	2.500K	2.100				0.006
75/05/15	15	30							
75/06/17	11	00							
CP(T)-			26.300	2.000	0.084	16.000	49.000		
75/06/17	17	15							
75/07/16	11	00							
CP(T)-			14.700	3.600	0.025	19.500	19.500		
75/07/16	15	00							
75/08/14	11	00							
CP(T)-			5.800	5.600	0.150	17.500	17.500		
75/08/14	15	45							
75/09/17	11	00							
CP(T)-			0.100	51.000	32.000	10.500	12.000		
75/09/17	15	30							
75/10/17	15	30	0.175	53.000	37.000	9.300	10.000		
75/11/17	11	00							
CP(T)-			18.000	4.700	0.025	9.850	10.000		
75/11/17	15	45							
75/12/22	11	45							
CP(T)-			8.000	6.000	0.050	9.800	11.200		
75/12/22	15	30							
76/01/16	11	30							
CP(T)-			4.950	18.000	5.725	6.100	12.020		
76/01/16	16	00							
76/02/17	11	30							
CP(T)-			23.700	1.800	0.020	12.600	13.000		
76/02/17	15	30							
76/03/19	11	00							
CP(T)-			7.500	11.500	0.250	8.400	14.000		
76/03/19	15	30							
76/04/20	12	30		1.000			11.000		

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/11/30
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0410EF AS0410EF
33 24 00.0 110 47 00.0 4
HOLGATE
04 7.5 GLOBE
T/ROOSEVELT LAKE 110491
PINAL RIVER
11EPALES 2141204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
75/06/17	10	30							
CP(T)-			2.200	7.000	0.290		13.500	0.015	0.010
75/06/17	20	00							
75/07/07	08	00							
CP(T)-			5.200	2.050	0.025K	9.600	13.000	0.008	0.010
75/07/07	16	00							
75/08/11	09	00							
CP(T)-			5.300	2.500	0.125	9.400	9.650	0.010	0.009
75/08/11	15	00							
75/09/02	11	00							
CP(T)-			0.650	8.000	0.310	10.500		0.009	0.009
75/09/02	16	15							
75/09/30	08	00							
CP(T)-			0.375	7.200	0.055	12.000	13.000	0.007	0.007
75/09/30	16	15							
75/11/04	09	10							
CP(T)-			8.000	3.700	0.100	13.000	13.500	0.009	0.008
75/11/04	15	00							
75/12/08	08	47							
CP(T)-			13.800	4.400	0.025K	14.500	16.500	0.003	0.003
75/12/08	14	05							
76/01/19	09	32							
CP(T)-			5.200	1.000K		14.400	15.000	0.013	0.013
76/01/19	13	15							
76/02/23	11	00							
CP(T)-			16.800	1.000K		14.500	14.500	0.015	0.012
76/02/23	15	00							
76/04/12	10	40							
CP(T)-				2.500			13.000	0.015	0.012
76/04/12	13	50							
76/05/06	11	00							
CP(T)-				2.400				0.028	0.028
76/05/06	14	10							

K VALUE KNOWN TO BE LESS
THAN INDICATED

43

STORET RETRIEVAL DATE 76/11/30
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0410MA NU0410MA P000000*
34 25 00.0 111 05 30.0 4
TONTO FISH HATCHERY
04 15 PROMONTORYBUT
T/ROOSEVELT LAKE 110592
TONTO CREEK
11EPALES 2141204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
75/03/17	10	00							
CP(T)-			0.400	1.000K	0.320	0.246		1.070	1.070
75/03/17	16	00							
75/04/14	09	00							
CP(T)-			0.050	1.700			0.350	2.990	2.990
75/04/14	15	00							
75/05/13	09	30							
CP(T)-			0.100	1.300	0.600	0.212	0.270	1.850	1.850
75/05/13	15	15							
75/06/10	09	00							
CP(T)-			0.100	0.500	0.430	0.203	0.210	2.150	2.150
75/06/10	15	00							
75/07/22	09	00							
CP(T)-			0.200	0.670	0.320	0.100	0.320	1.540	1.540
75/07/22	15	00							
75/08/11	09	00							
CP(T)-			0.075	1.800	0.110	0.110	0.280	1.490	1.490
75/08/11	15	00							
75/09/08	09	15	0.425	1.300	0.100K	0.110	0.160	1.780	1.780
75/10/20	09	00							
CP(T)-			0.150	3.000	0.100K	0.335	0.180	1.850	1.850
75/10/20	15	00							
75/11/24	08	45	0.125	2.000	0.081	0.117	0.150	2.500	
75/12/17	09	00							
CP(T)-			0.175	1.400	0.064	0.100	0.100	2.580	2.580
75/12/17	15	15							
76/01/26	08	30							
CP(T)-			0.025	0.300	0.025		0.110	1.290	1.290
76/01/26	15	00							

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 76/11/30
NATL EUTHOPHICATION SURVEY
EPA- LAS VEGAS

0410YA NU0410YA P000000*
34 18 00.0 110 48 00.0 4
CANYON CR. FISH HATCH
04 15 WOODS CANYON
T/ROOSEVELT LAKE 110592
CANYON CREEK
11EPALES 2141204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
75/03/17	10	00							
CP(T)-			0.160	1.000K	0.180	0.100K	0.100K	8.050	8.050
75/03/17	16	00							
75/04/14	10	00							
CP(T)-			0.050	0.860	0.180	0.079	0.100K	3.420	3.420
75/04/14	16	00							
75/05/13	10	10							
CP(T)-			0.050	0.500K	0.089	0.100	0.160	2.560	2.560
75/05/13	15	35							
75/06/10	10	00							
CP(T)-			0.100	0.500K	0.085	0.056	0.250	3.230	3.230
75/06/10	16	00							
75/07/22	10	00							
CP(T)-			0.125	0.500K	0.120	0.100	0.320	3.040	3.040
75/07/22	16	00							
75/08/11	10	00							
CP(T)-			0.150	1.200	0.150	0.175	0.300	2.730	2.730
75/08/11	16	00							
75/09/08	09	45	0.100	3.800	0.060	0.115	0.830	3.230	3.230
75/10/20	09	30							
CP(T)-			0.125	3.000	0.025K	0.100	0.170	2.340	2.340
75/10/20	15	30							
75/11/24	09	30	0.160	2.200	0.110	0.110	0.190	3.700	
75/12/11	09	45							
CP(T)-			0.150	1.600	0.025K	0.140	0.400	3.410	3.410
75/12/11	16	35							
76/01/26	09	30							
CP(T)-			0.175	0.500	0.032	0.160	0.170	2.510	2.510
76/01/26	15	30							
76/02/17	10	00							
CP(T)-			0.100	1.000K	0.163	0.080	0.140	3.540	
76/02/17	16	00							
76/03/16	10	10							
CP(T)-			0.230	0.700	0.320	0.080	0.165	3.420	
76/03/16	14	00							

K VALUE KNOWN TO BE LESS THAN INDICATED

STORET RETRIEVAL DATE 76/11/30
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

041021 AS041021 P000100
33 39 30.0 110 0M 00.0 4
II INC. (ROOSEVELT MARINA)
04007 7.5 PORAS BUTTE
D/ROOSEVELT LAKE
ROOSEVELT LAKE
11EPALES 2141204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
75/03/17	10 00		19.200	1.000K	0.080K	6.000	6.100		
75/04/17	10 00		42.000	0.770	0.100	7.900	7.900		
75/05/22	09 30		8.500	0.500K	0.130	8.600			
75/06/19	09 00		5.250	0.500K	0.050K	8.100	8.100		
75/07/24	10 00		14.000	2.000	0.050K	7.100	7.100		
75/08/21	14 00		15.400	1.800	0.075	4.790	4.970		
75/09/26	09 50		21.000	1.600	0.080	6.700	6.700		
75/10/28	10 30		39.000	1.100	0.055	6.700	7.200		
75/12/02	09 30		34.500	1.700	0.025		8.600		
75/12/29	09 00		3.600	19.000	3.700	5.300	5.600		
76/01/29	14 45		0.100	23.000	4.900	9.000	9.700		

K VALUE KNOWN TO BE LESS
THAN INDICATED

APPENDIX E

PARAMETRIC RANKINGS OF LAKES SAMPLED BY NES IN 1975

STATE OF ARIZONA

Mean or median values for six of the key parameters evaluated in establishing the trophic conditions of Arizona lakes sampled are presented to allow direct comparison of the ranking, by parameter, of each lake relative to the others. Median total phosphorus, median inorganic nitrogen and median dissolved orthophosphorus levels are expressed in mg/l. Chlorophyll a values are expressed in µg/l. To maintain consistent rank order with the preceding parameters, the mean Secchi disc depth, in inches, is subtracted from 500. Similarly, minimum dissolved oxygen values are subtracted from 15 to create table entries.

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	ME	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
0401	BIG LAKE	0.032	0.[illegible]	336.000	2.900	9.000	0.007
0402	FOOLS HOLLOW	0.059	0.[illegible]	466.600	10.683	14.800	0.014
0403	LAKE HAVASU	0.015	[illegible]	420.231	3.948	10.800	0.005
0404	LUNA LAKE	0.182	[illegible]	396.250	3.400	12.200	0.131
0405	LYMAN LAKE	0.099	0.[illegible]	394.667	2.633	9.000	0.056
0406	LAKE MOHAVE	0.017	[illegible]	369.667	4.404	8.600	0.010
0407	LAKE PLEASANT	0.027	0.[illegible]	449.154	9.808	14.900	0.004
0408	LAKE POWELL	0.009	0.400	239.000	1.333	12.200	0.010
0409	RAINBOW LAKE	0.046	0.045	440.750	16.367	12.000	0.009
0410	ROOSEVELT LAKE	0.020	0.040	429.917	4.073	14.000	0.008
0411	SAN CARLOS RESERVOIR	0.056	0.060	474.500	14.750	14.600	0.009
3201	LAKE MEAD	0.020	0.505	453.600	1.150	8.000	0.007

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500- MEAN SEC	MEAN CHLORA	15- MIN DO	MEDIAN DISS ORTHO P
0401	BIG LAKE	45 (5)	41 (4)	82 (9)	73 (8)	77 (8)	73 (8)
0402	FOOLS HOLLOW	18 (2)	41 (4)	18 (2)	18 (2)	9 (1)	18 (2)
0403	LAKE HAVASU	91 (10)	27 (3)	64 (7)	55 (6)	64 (7)	91 (10)
0404	LUNA LAKE	0 (0)	73 (8)	73 (8)	64 (7)	41 (4)	0 (0)
0405	LYMAN LAKE	9 (1)	64 (7)	0 (0)	82 (9)	77 (8)	9 (1)
0406	LAKE MOHAVE	82 (9)	18 (2)	91 (10)	36 (4)	91 (10)	32 (3)
0407	LAKE PLEASANT	55 (6)	95 (10)	36 (4)	27 (3)	0 (0)	100 (11)
0408	LAKE POWELL	100 (11)	9 (1)	100 (11)	91 (10)	41 (4)	32 (3)
0409	RAINBOW LAKE	36 (4)	82 (9)	45 (5)	0 (0)	55 (6)	45 (5)
0410	ROOSEVELT LAKE	68 (7)	95 (10)	55 (6)	45 (5)	27 (3)	64 (7)
0411	SAN CARLOS RESERVOIR	27 (3)	55 (6)	9 (1)	9 (1)	18 (2)	55 (6)
3201	LAKE MEAD	68 (7)	0 (0)	27 (3)	100 (11)	100 (11)	82 (9)